DECISION MAKING UNDER UNCERTAINTY MARKET DURING COVID-19

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ABSTRACT

This article discussed decision-making models in the context of crisis and uncertainty during the COVID-19 pandemic. Time and information constraints, the effectiveness of government policies, and public expectations were used to build the research model. Data were collected by distributing a semi-open and closed survey questionnaire (Google Forms). The statistical result showed that the decisions taken during a crisis/pandemic were more determined by the time constraints and the information (significantly positive) than the government policies and the public expectations (negative is not significant). Related to the effectiveness of the health and economic policies taken by the government, it concluded the effective response; however the virus recurs, the public health response succeeds, but measures are insufficient to prevent recurrence so that physical distancing continues (regionally) for several months. Analysis of the survey respondents towards the government economic policy assessed that government policy was still partially effective intervention, policy responses partially offset economic damage, the banking crisis was avoided, and muted recovery levels. The economic impact of co-19 predicted a slow economic recovery, supported by respondents' expectation of pessimism towards future economic conditions.

Keywords: *Decision Making, Time Constraints, Information, Policy, Expectation*

JEL: D70;D81; D82; D91

Introduction

COVID-19 pandemic, the end of 2020 in a short time spread to about 157 countries, and the number of fatalities continues to grow. Correspondingly, information about COVID-19 is also increasingly massive, but the information that reaches the public is only a piece of information that triggers fear and anxiety, and uncertainty. The costs of the annual economic risk of a pandemic is around 0.6 percent of global income; the sector engaged in the pharmaceutical sector has a large profit, while the insurance and mental health sectors tend to bear high costs in the short term, and the poor have difficulty accessing limited health, trade imbalances, exchange rate movements and changes in market interest rates (Fan et al., 2018).

This pandemic is also felt in Indonesia, its impact on the real market; this condition undermines the trade, tourism, and investment sectors because most of the imports, tourists, and investments to Indonesia come from China. At the micro-level, on the demand side, individuals panic buying-stocking up on utilitarian goods such as masks, hand sanitizers, antiseptic and disinfectants, alcohol, and food in large quantities as a response and control to feel safe from the crisis. On the supply side, this behavior causes scarcity due to disruption of productivity and price gouging of these goods and may provide benefits for rent-seeking as well as losses for patients and medical personnel who need while in the financial market, there is a foreign capital withdrawal that is withdrawal flows outgoing foreign capital of 104.7 trillion. Then from the macro side, this is indicated by the weakening of the rupiah against the US dollar to the level of Rp. 16,741, - (2 April 2020).

Related to this pandemic, the government has taken a series of health and economic policies to mitigate the spread of covid-19 and anticipate panic, including asking citizens to work, study and worship from home, social/physical distancing, area quarantine/lockdown, fiscal deficit policy, and policies monetary. The policy ultimately has an impact on reducing the socio-economic activities of society, such as disruption of a supply shock, reduction of working hours and termination of employment, scarcity and price increases on several types of goods, as well as other effects that have implications for uncertainty in the market. The impact of this condition economically causes changes in the behavior of economic agents. In economic theory, each individual is believed to act logically and rationally and make decisions based on optimizing their utility. According to Nash, our optimal strategy will depend on what other people are doing; by working together, the results achieved will be optimal (Nash Equilibrium). But behavioral economics theory is different and does not apply, people make decisions based on experience, emotions, and even irrational things can be rational only for personal interests as a quick and efficient response to survive a crisis and uncertainty.

These conditions are panic, where decisions made by individuals in panic situations are built with the model: Perception – Factor Structural – Behavior. Perception: panic cannot occur without an individual's perception of a hazardous stimulus; their inability to deal with threatening situations; and the potential to save themselves do not exist. Structural factors: situations, norms, previous experiences, other behaviors, physical and emotional states of individuals, observation of leader panic, individual/group goals, panic threshold (estimated profit). Behavior: withdrawal, panic buying, rush, and others (Strahle et al., 1951). Consumers make rational and systemic decisions by using and combining all information obtained (cognitive decision-making) or decisions based on feelings or emotions (affective decision-making). So, in a crisis or panic situation, with limited information and time, people use feelings/emotions to make decisions based on the experiences and perceptions of others as obstacles that are proportional to the level of crisis, and the zero-sum game is a decision point for individual panic threshold in making a decision (Hoyer and Deborah, 2009).

This paper examines a community decision-making model using a cross-sectional population-based survey with time constraints, information, government policies, community expectations of crisis/pandemic conditions, and future economic conditions related to uncertainty. Data collection was carried out using a google form questionnaire survey that was given to the public through social media in the cities of Makassar, Merauke, Jayapura, and Palopo. The variable of consumer crisis economic decision-making is built on a Likert scale, which is analyzed in the regression equation, and the peak of the pandemic is also calculated using the optimum value of the regression equation.

Literature Review

The current pandemic health crisis condition was explained by Thaleb in the Black Swan Theory that: (1) this condition is a game-changer event (which is an outlier) that occurs surprisingly beyond 'normal' expectations, and the impact involves many people and is difficult to predict; (2) On events that escape the calculation and do not enter the observer 'radar.' If analyzed with careful calculation, the probability is also minimal to be a cause of a significant event and determine the fate of a population; (3) this condition is a psychological bias that causes people not to pay attention to a phenomenon of uncertainty - both individually and collectively - so that it can be said to live in the illusion of 'comfort zone' (Makridakis and Bakas, 2016).

In crisis conditions, panic tends to occur. Savage (2013), panic is a random behavior of individuals to save themselves even at the expense of others. Panic can spread and be prevented or reduced by social control. In a panic condition, the characteristics of decision-makers will determine the quality of economic decisions. In crisis decision theory and naturalistic decision making, emphasizing the role of cognitive processes, dangerous and life-threatening situations will activate negative emotions that can uniquely influence recursive associations of cognitive schemes after a crisis (Dionn, et al., 2018). Individuals see, interpret, and assess information through interactions with others, thus making collective crisis decisions as a level of substantive analysis. In panic or crisis conditions, decisions are influenced by confirmation bias, where a person tends to accept references or information bias and influence how people collect and interpret information and produce inappropriate decisions. The behavioure is a psychological bias/cognitive bias, which is the tendency to make decisions/actions without looking at the situation objectively and making illogical/irrational decisions (Tversky and Kahneman, 1987). It is called bounded rationality Barros (2010); Hernandez and Ortega (2019), that individual rationality decision-making is limited by the information they have, cognitive limitations of the mind, and a limited amount of time to make decisions.

In decision-making theory, there are various perspectives on decision-making and checking methods. They are (1) Normative, an emphasis on rational choices where the model is built on the assumptions of logical guidelines for decision making; (2) Descriptive, ways to make choices; (3) Prescriptive, including descriptive and predictive analysis, the implementation of rational models accompanied by simplifying complex decision environments to a reasonable level that is vulnerable to analysis (McFall, 2015). Rational decision-making model through trade-offs between cost and decision quality in a situation full of risks and pressures. More time allocation will improve decision-making; therefore, the optimal quality of decisions depends on the opportunity cost (Hausfeld and Resnjanskij, 2018). The ability to cope with time pressure varies significantly across decision-makers. Besides, cognitive ability and intellectual efficiency measures together predict the quality of individual decisions and the ability to keep their decision strategies under time pressure (Kocher et al., 2019). Time constraints cause risk-seeking behavior in the loss domain (Young et al., 2012). When dealing with time constraints, adaptive decision-making can use heuristic decisions because they are faster economical and use less information. If the heuristics are correct, then the decision is accurate (Gigerenzer and Brighton, 2009).

In emergencies, public health sometimes involves making difficult decisions, including when to tell the public about threats, when to close schools, suspend public activities, release drugs, and allocate limited resources. Health practitioners, the government, and the public have difficulty making rational crisis decisions because they have little experience, are

limited by time (time constraints), and have biased confirmation (Parker et al., 2009). A timely response to the epidemic is critical. Health costs will rise, epidemics force sick people out of work and reduce productivity, and fear of infection will disrupt economic activities: trade, travel and tourism, investment in areas affected by the plague, and social activities. If a person is limited by time (time constraints) and confirmation bias, then decision-makers speed up the processing of their information and reduce the amount of time they spend looking for pre-determined information; in other words, individuals will spontaneously look for shortcuts to get out of the situation (Bloom, et al., 2018).

In rational expectation theory, individuals base their decisions on rationality, available information, and past experiences. Keynes called it "waves of optimism and pessimism," while Muth explained that the economic situation depends on what people expect to happen. Decision-making during crises is influenced by several sources of information and prior knowledge, such as factual information (statistics), other people's narratives, and real-time government information (Bakker et al., 2019). Under uncertainty conditions, decision-making is based on the probability of various event development scenarios for entities that make unknown risk decisions. When choosing an alternative decision, the subject is guided by risk preference, on the other hand, with the appropriate criteria for choosing from all alternatives according to the decision matrix. The task of making decisions in the face of uncertainty is the task of choosing an optimal strategy, the results of which, among other things, depend on many uncertain actors. As a result, each decision corresponds not only with one outcome but many results (Korepanov et al., 2019).

Data and Research Methods

This research used a mixd method-concurrent embedded combined quantitative and qualitative research methods simultaneously. The primary method was used to obtain the main data, and used the second method to support data received from the primary method (Creswell, 2014; Tashakkori and Teddlie, 2015).

Data were collected by distributing a semi-open and closed survey questionnaire (Google Forms) through social media. Observations were made in Merauke, Jayapura, Makassar, and Palopo that participated in the survey. Pandemics in the observed area do not have different characteristics from other regions in Indonesia. However, the demographic, socio-economic, and health infrastructure conditions are different, so decision-making to respond to a pandemic is also different. The secondary observations were done with direct observations of information circulating, which are related to Covid-19 data updates, current economic conditions, as well as a series of government policies related to health and economy (such as social distancing policies, work from home, and lockdown) during the observation period, began in February since Covid-19 was confirmed entry into in Indonesia. The collected data then tested their validity and reliability, which were displayed in univariate and multivariate forms. The validity instrument used the product-moment (Pearson Correlation) to prove the significance of the t-test results by comparing the t-count and t-table values. If t-count> t-table, we can conclude that the items are valid and vice versa. The questionnaire is reliable if the Cronbach alpha coefficient value is> 0.6. Multiple linear regression models of consumer crisis economic decision-making (CCEDM) with time constraints, biased/unbiased information, government policies in health and economy, and public expectations of future economic conditions were constructed to figure out becomes to determine the pattern of decision making.

$$CCEDM= f(Time\ Constraint;\ Information;\ Government\ Policies;\ Expectation) \tag{1}$$

Where time constraints were spreading victims of covid-19; information was biased and unbiased information; government policies were the effectiveness of covid-19 health policies and economic policies; the expectation was optimism or pessimism, market conditions, the level of trust in the government, and when the Covid-19 crisis ends.
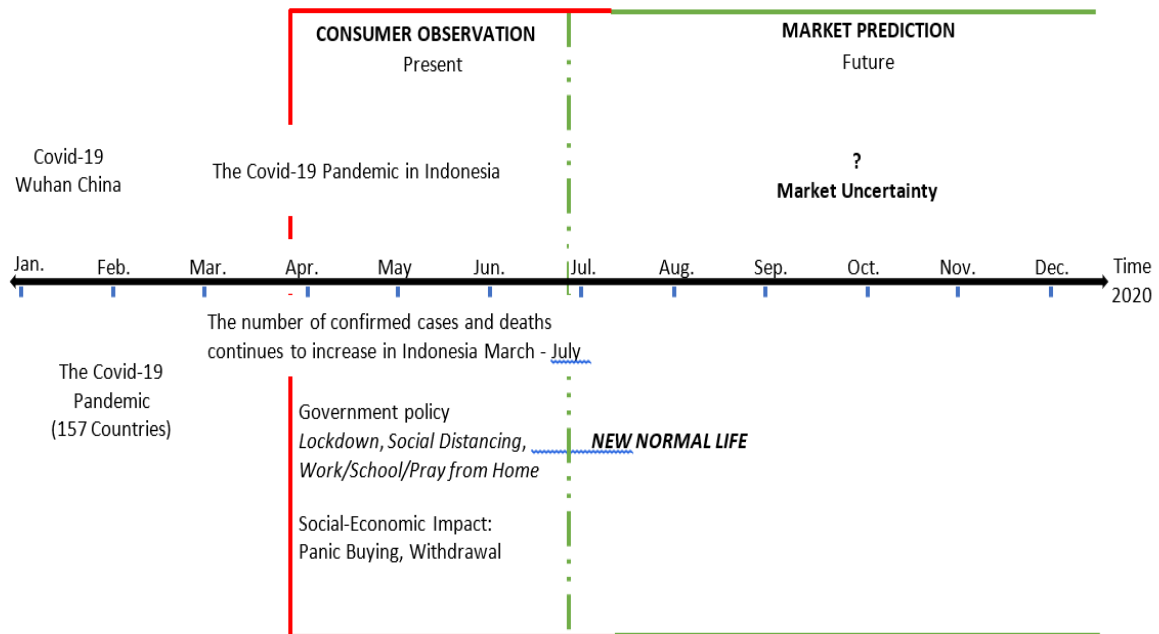

Figure 1: Time Observation

To see the peak of this pandemic by calculating the optimum value based on the model formed from the following regression equation:

$$Y = a + bX + cX^2 \qquad\qquad (2)$$

Where Y was the number of confirmed cases of covid-19 in Indonesia and X was the number of patients recovering, the period is 2 March-9 July 2020. The number of recovered patients needs to be in quadratic forms cause.

Result and Discussion

Decision-Making: Time Constraints, Information, Government Policies, and Expectation

To examine the behavior and patterns of decision making and public expectations of market uncertainty in the condition of the covid-19 pandemic, There are 152 respondents with the distribution of respondents in the city of Merauke (41 percent), Makassar (31 percent), and other cities (Jayapura and Palopo, 25 percent) with 38 items of statement distributed through Google Survey. There are 38 statement items that are grouped into five categories, namely decision making, time constraints, information, government policies, and expectations, as shown in Figure 2. The Y-axis is the Likert scale used in the answer choices of statement items, while the X-axis is the accumulation or total answer choice (ln). The validity test of 38 statement items showed 36 valid items and two invalid statement items, invalid statement items were excluded, and validity tests were carried out and placed in the medium category (0.40 0.67 < 0.80).
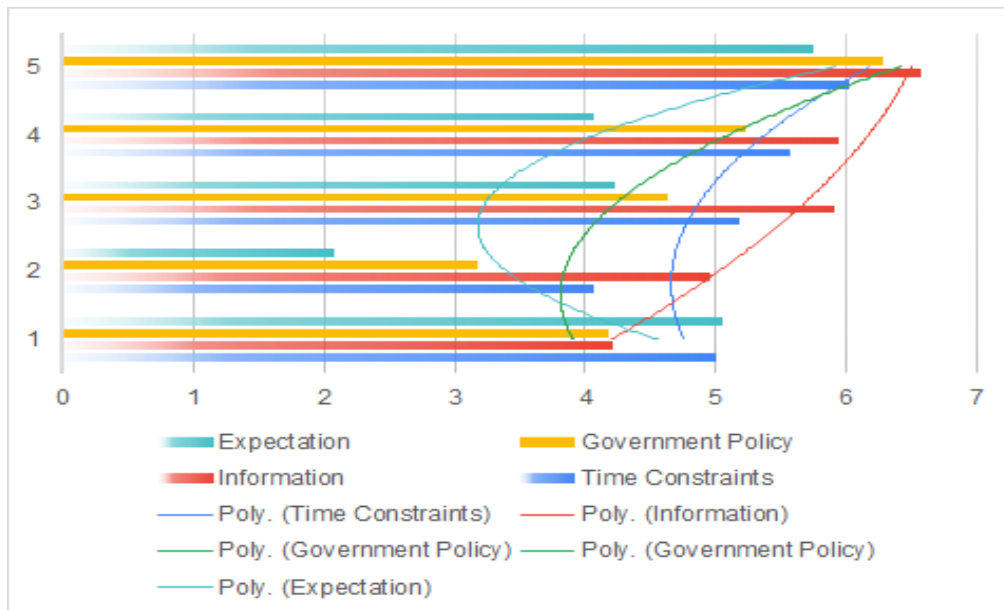
Figure 2: Consumer Crisis Economic Decision-Making Variable

Time constraints, information, government policy, and expected economic conditions will form a time pressure that will disrupt the cognitive ability and intellectual individuals to process and evaluate information to make decisions. The higher the time pressure, the individual will make a quick decision, whether the decision is optimal rational, or irrational, depending on the process of processing all these variables, whether using intellectual-cognitive or more emotional-affective. Intellectual-cognitive will produce rational decisions. On the contrary, if it uses emotion-affective, the decisions made tend to be irrational.

The survey results revealed that people received information by 48.7 percent from social media, 46.1 percent from online news/TV, and 5.2 percent from the government. The survey results put 84.2 percent of respondents active on social media, and 74.3 percent of respondents have friends of social media contact actively spreading news related to Covid-19. The most widely disseminated information is the number of victims (67.1 percent), the spread of Covid-19 (15.8 percent), prevention of Covid-19 (13.2 percent), followed by hoaxes (5.3 percent), and video/memes related to Covid-19 (0.7 percent). About 24.4 percent of respondents replied to this information through the social media comment column, 29.6 percent believed the information, 78.9 percent checked the truth of the information, 55.3 percent checked through online news, 40.1 percent used an internet browser, 3.9 percent checked through the social media comment column, and 0.7 percent did not check the information. Other survey information, as many as 88.8 percent of respondents knew the dangers and ways of spreading Covid-19, while 46.7 percent of respondents said they could distinguish COVID-19 sufferers from those who suffer from colds and coughs (figure 3).

Time constraints and biased information form a time pressure that will hamper people's intellectual and cognitive abilities to process and evaluate information systematically, so they tend to use heuristics to make decisions and trigger people to be self-interested by making independent prevention efforts in response to a sense of security and control of the COVID-19 pandemic. In the survey, 79.6 percent of respondents believed wearing masks, and hand sanitizers could prevent virus. However, about 16.4 percent and 3.9 percent ofof respondents expressed doubt and were unsure (figure 4). Furthermore, the survey results show that 87.5 percent of respondents stated that they bought masks, soap, hand sanitizers, disinfec-

tants, alcohol, vitamins, or other health supplements in large quantities, causing price increases. Therefore this condition was utilized by rent-seeking to seek profits resulting in scarcity.
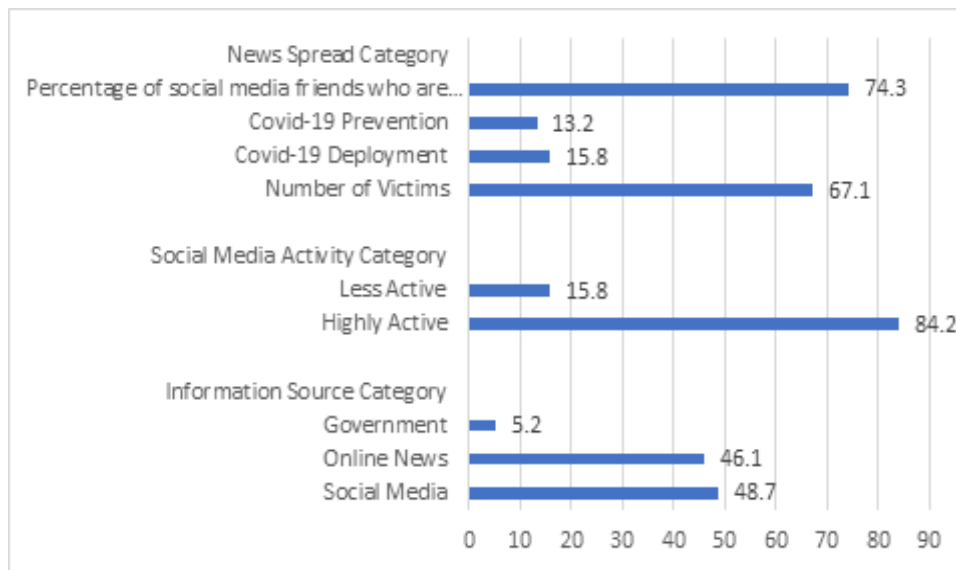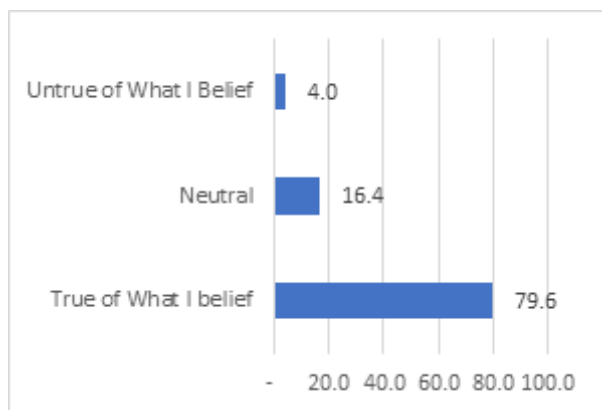

Figure 3: Survey Information Category

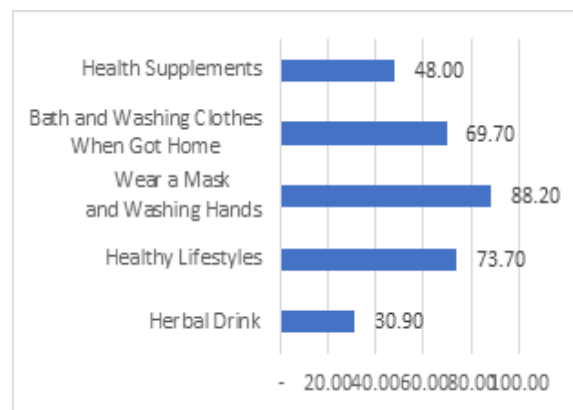**Figure 4: Wearing a Mask and Hand Sanitizer Can Prevent the Spread of the Virus**
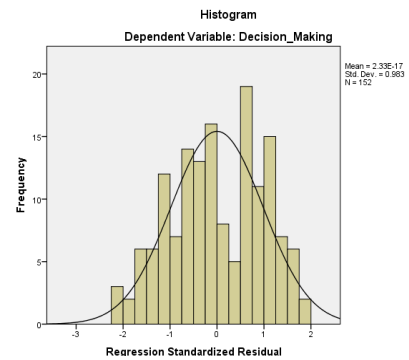

Figure 5: Self-Prevention Efforts

Figure 5 reveals some prevention efforts for Covid-19. About 88,2 percent indicates that wearing a mask and washing their hand can prevent people from the virus, while only 30,9% and 48% believe consuming herbal drinks and health supplements may sustain their health. Other respondents (69,7%) said bathing and washing their clothes after leaving their home may reduce the potential infection by Coronavirus.

Decision-making in this article is defined as a series of steps that a decision-maker must consider to make the best choice among alternative measures. Decisions that matter require conscious thinking, gathering information, time, and consideration of alternatives. In pandemic conditions, individual decisions are also determined by government policies and economic expectations. These variables are processed based on the intellectual-cognitive or emotional-affective individuals that lead to the decision-making in this article using a Likert scale model.

Analysis of determinants of influence decision making in this study demonstrates that time constraints have a positive effect (0.181) and significant (0.001); Information has a positive effect (0.187) and significant (0,000) while government policy and expectation has a negative effect (-0.006 and -0.055), which is not significant on decision making. Increasing time constraints means demanding faster decision-making. On the contrary, if there are decreasing time constraints, there is a slower trend of decision-making. Unbias information makes decision-making more maximal and rational; conversely, biased information demands more careful decision-making.

Table 1: Output Analyze Statistic dan Normality

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Histogram
	B	Std. Error	Beta			Dependent Variable: Decision_Making
(Constant)	-.934	2.436		-.383	.702	
Time Constraints	.181	.055	.247	3.324	.001	
Information	.187	.051	.307	3.638	.000	
Government Policy	-.006	.081	-.006	-.074	.941	
Expectation	-.055	.087	-.050	-.633	.527	
a. Dependent Variable: Decision Making,152 respondents in 4 cities						

Time constraints, information, government policy, and expectation of economic conditions form a time pressure that will disrupt individuals' cognitive and intellectual abilities to process and evaluate information to make decisions. The higher the time pressure, the quicker the individual makes decisions. Whether the decision is optimal rational, or irrational, depends on how to process all of these variables if it uses an intellectual-cognitive or more emotional-affective process. Intellectual-cognitive will produce rational decisions. On the other hand, if it uses emotion-affective, the decisions tend to be irrational. The optimal strategy for making decisions under conditions of uncertainty is based on the unknown probability and risk preferences for choosing the best decision from all decision alternatives. Statistical data normality test, using a Jarque-Berra test and histogram, with a skewness value of -0.226 and kurtosis of -0.583; hence the JB value is 0.242 with a significance level of 5 percent, and Chi-Square value with df = 2 is 5.99 then 0.242 <5.99 (JB <Chi Square). It means that no residual normality problems were found in these data.

Market Uncertainty: Expectation

During the pandemic (March to July 2020), 52 percent of respondents experienced an increase in expenditure compared to the day before the pandemic, 32.9 percent said their expenses remained fixed, and 15.2 percent had decreased spending. Respondents' more considerable expenditure was still dominated by food items 42.8 percent, followed by cellular spending/data 32.9 percent, and valuable goods (masks, soaps and hand sanitizers, and disinfectants) while 5.3 percent for other expenditure categories. About 87.5 percent of respondents did stock up/panic buying food and useful goods. This decision was carried out for inventory reasons; they bought in large quantities for fear of being out of stock (62.5 percent) and also afraid of prices going up (32.9 percent) and 2.6 percent because of seeing and following along with people around. In terms of ease of access to obtaining masks, soap and hand sanitizers, and disinfectants, as many as 78.3 percent of respondents had difficulty

finding these items. Then about 89.5 percent of respondents expressed that there had been an increase in prices, and about 65.1 percent of respondents said that they were willing to pay a high price, while around 34.9 percent of respondents chose not to buy. In the survey, approximately 89.5 percent of respondents prefer to make their food rather than buying at a food stall (10.5 percent). While as many as 87.5 percent of respondents predicted there would be price increases. As a result, the inflation effect will have a double-hit on public spending.
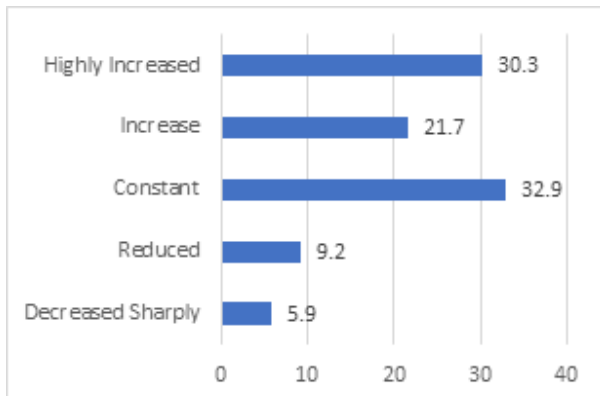
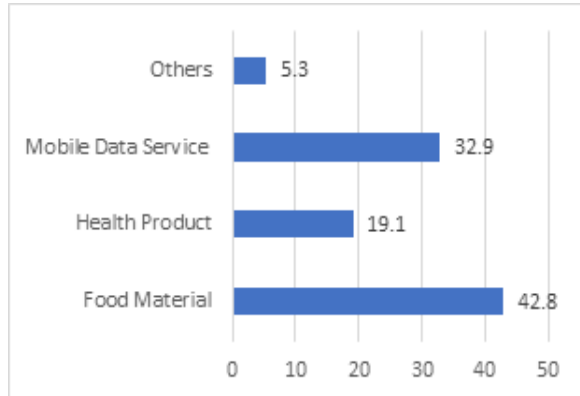**Figure 6: Percentage of expenses during WFH and Social/Physical Distancing;**   **Figure 7: Percentage Expenditure Group**

The second-largest expenditure is for cellular data; this is the effect of government policies that require people to work, study, and pray from home online/online. Also, lockdown and social distancing require people to stay at home and spend much time accessing the internet as entertainment. The communications/internet service provider and application sectors have increased during this pandemic. The most affected sectors are the large to micro trade sectors (garment industry, restaurants, entertainment venues, malls, and hotels); the transportation sector and the service sector (motorcycle taxis and day laborers) run the risk of reducing wages and working hours and termination of employment of workers. The reason is because of efficiency and high operational costs compared to the revenue, which causes income to disappear suddenly. In the survey, as many as 89.5 percent of respondents prefer making their food rather than buying it at a food stall (10.5 percent). The price increase due to the COVID-19 pandemic will be followed again by price increases entering the month of Ramadan; as many as 87.5 percent of respondents expect price increases to occur as in previous years so that the inflation effect will double hit on public and market spending.

As of May 27, 2020, the Ministry of Manpower recorded at least 1,792,108 workers affected by the Covid-19 pandemic. In detail, about 1,058,284 workers in the formal sector had been working from home, around 380,221 had been laid off, while exactly 318,959 informal sector workers were affected by the pandemic and nearly 34,179 prospective migrant workers were failed to depart, and around 465 repatriated.

Besides that, to mitigate the virus spreading, the government urged the public not to travel outside the region. The survey showed that 80.9 percent of respondents worried about contracting this virus, and about 75.8 percent worried about the crowd. Public compliance survey related to government appeals can be seen from the intensity of respondents leaving the house; around 73 percent of respondents departed their house just as much as 1-2 times/week, 14.5 percent (2-3 times/week), 7.9 percent (3-4 times/week) and 4.6 percent went out every day. Regarding this policy, around 61.1 percent of respondents chose not to travel outside their region, 28.3 percent were still hesitant, and 10.1 percent chose to stay home. The

impact of travel restrictions and lockdown policy caused a drastic reduction in the number of passengers and the unoperated public transportation modes.
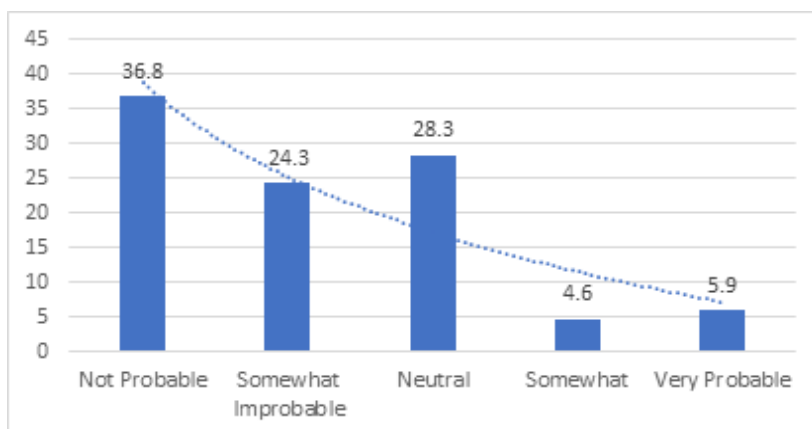

Figure 8: Percentage Decision to Travel

Based on consumption behavior during this pandemic, interestingly, during the current crisis conditions, 70.4 percent of respondents chose not to hold cash, and only 29.6 percent chose to hold cash. Therefore, there is no potential for rush or withdrawal in the banking sector. If the situation is still out of control, 81.5 percent of respondents said they agree if the government's current mitigation policy is extended. Only 6.3 percent of respondents disagree, and 11.2 percent do not provide an answer.
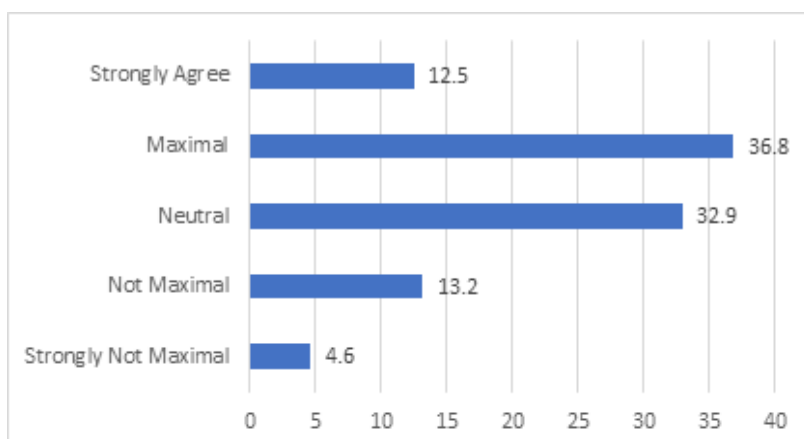

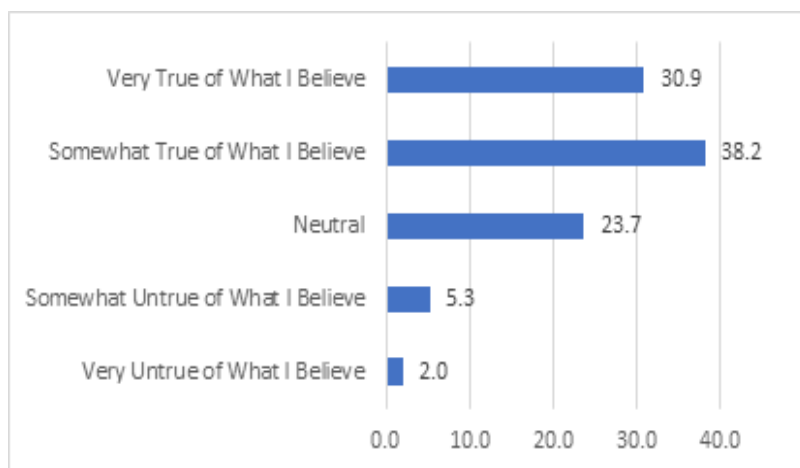
Figure 9: Government's Covid-19 Prevention Measure

Figure 10: Level of Confidence of the Government Able to Overcome Coronavirus

Future Economic Condition

The virus pandemic has an impact on the real market. On the demand side, panic buying occurs, while on the supply side, productivity disruptions cause scarcity. In the financial markets, there is panic selling; the expectation of getting out of uncertain conditions is not getting anything. In the short term, panic buying spurs public consumption and increases demand for foodstuffs and valuable products, resulting in price increases. This condition is also utilized by rent-seeking to hold the supply of these goods for profit; consequently, goods become increasingly scarce, and prices soar increasingly high. In the long run, there will be disruption of production, supply shock, decreasing productivity caused by the scarcity of raw materials for the industry, low production that may lead to inflation and trigger a shortage or excess demand, as well as reducing in household consumption by less purchasing power due to loss of income and lay off.

Based on the survey consumption behavior during the pandemic, nearly 70.4 percent of respondents chose not to hold cash, in contrast to 29.6 percent. Therefore, there is no potential for a rush in the banking sector. In a normal situation, the economic growth was in the range of 5 percent, while the realization of economic growth in the first quarter of 2020 was 2.97 percent; thus, there was a loss of potential growth of around 2.03 percent. Quantitatively, the current GDP was approximate Rp.15,800 trillion with a loss potential growth of 2.03 percent, then an economic loss of Rp. 320 trillion. The survey also illustrated that 61.2 percent of respondents showed pessimistic expectations of economic growth (assessing the economy will decline), 21.7 percent predicted normal or no change in economic condition, while the other 17,1 percent were optimistic.
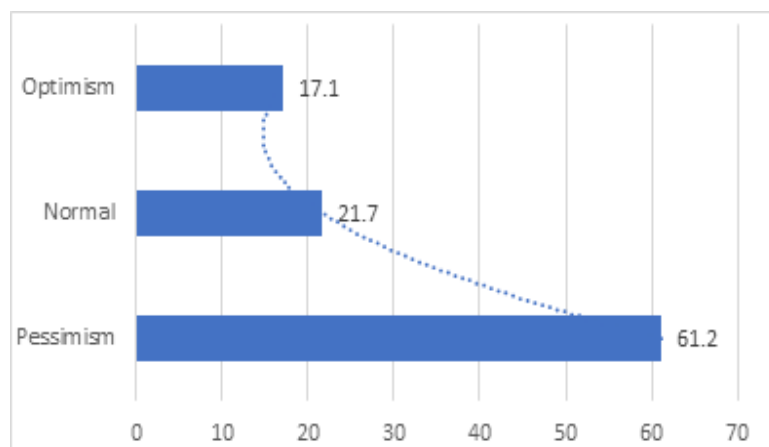

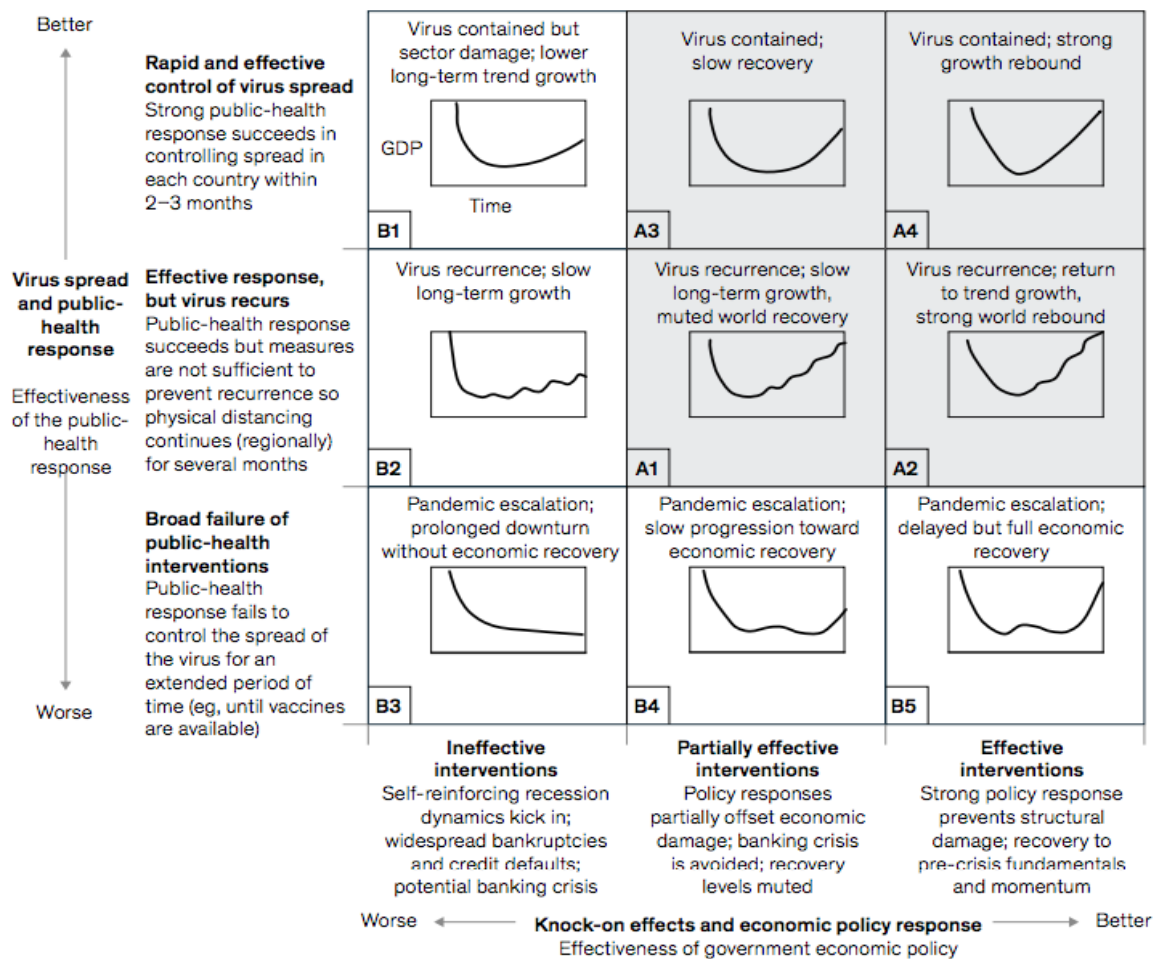**Figure 11: Economics Expectation: Optimism or Pessimism**

If these conditions continue, the economic growth will slow, resulting in stagflation. Therefore, the government has decided on the 'new normal' era. On the other hand, people also made reactive decisions addressing pandemics and government policy. Referring to Nash, the optimal strategy for overcoming this health crisis is integrating government policies, health agencies, and the community. With the government policies, all available resources, and public participation by following all the government appeals, the results are expected to be optimal (Nash Equilibrium). The survey demonstrated that 90 percent of respondents agreed with government policy and followed the government appeals for mitigating the spread of Covid-19 and new-normal life.

McKinsey presents a scenario of the impact of the virus spreading based on its responses in the health and economic policy field.The response in the health sector is divided

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into three levels: rapid and effective control of the spread of the virus (2-3 months), effective response but with a recurring case of viruses (in several months), failed intervening health measures (long enough until the vaccine is found). In comparison, the effectiveness of economic policy is also divided into three stages; ineffective interventions, partially effective interventions, and effective interventions. This health response and economic policy combination can be drawn in a combined matrix that indicates nine impact scenarios and economic recovery curves after the Covid-19 pandemic. Each scenario displays GDP (growth) on the vertical axis and time on the horizontal axis. The best scenario is when the virus can be overcome, and economic growth returns strong, illustrated by a V graphic shaped (A4). Meanwhile, the worst scenario is when the pandemic gets worse, the slowdown is prolonged, and the economy does not recover (an L graphic shaped (B3) (McKinsey and Company 2020).

Source: McKinsey and Company (2020)

Figure 12: Scenarios for the Economic Impact of the COVID-19 Crisis; GDP Impact of COVID-19 Spread, Public-Health Response and Economic Policies

Referring to the survey results and related to the effectiveness of government mitigation policies and respondents' preferences for future economic conditions in the McKinsey matrix, it can be concluded that the government's health response is in the category of effective response. Still, the virus recurs, and public health response succeeds, but measures are insufficient to prevent a recurrence, so physical distancing continues (regionally) for several

months. In terms of economic policy, respondents considered that government policies were still partially effective intervention, policy responses partially offset economic damage; the banking crisis was avoided; muted recovery levels. Thus, the impact of Covid-19 on the economic scenario leads to the A1 scenario, slow long-term growth recurrence virus, and muted world recovery, both predict slow economic recovery.

According to the prediction of Data-Driven Innovation Lab-Singapore University of Technology and Design (DDIL-SUTD) in the picture (a) describes Covid-19 predictions in Indonesia will end from June 6 to June 23, 2020. In picture (b), based on the results of a survey conducted, respondents' expectations in the three cities indicate that the level of public trust in the government was 69.1 percent were optimistic, 23.7 percent were skeptical and 7.3 percent were not sure that the government can quickly overcome this pandemic. As many as 38.2 percent of respondents predicted it would end in the range of June to mid-July 2020; there were 13.8 percent of respondents stated mid-May to mid-June, 15.1 percent of respondents said the outbreak ended in mid-July to mid-August, and the remaining 13.2 percent predicts between mid-August and mid-September 2020.
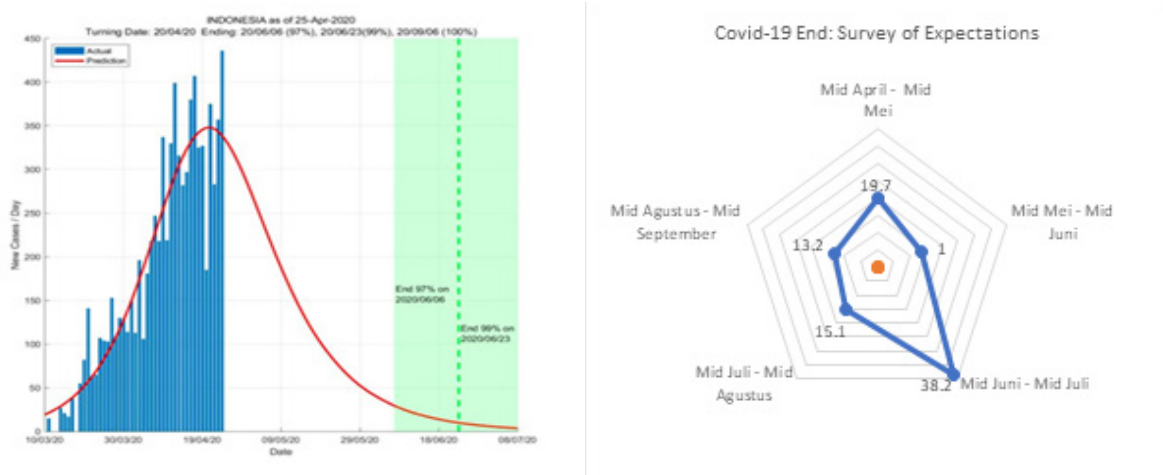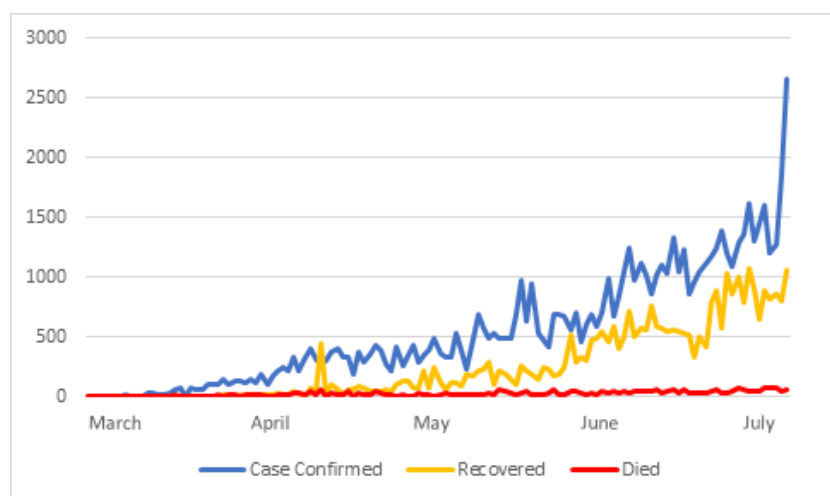

Figure 13: When does Covid-19 End? a. DDIL-SUTD prediction; b. Respondent Expectation Result Survey

Sumber: https:covid19.go.id/peta-sebaran

Figure 14: Covid-19 Trend March-July 2020

Until June 9, 2020, Covid-19 cases were still increasing and have not shown a flat or downward trend. Total confirmed cases up to July 9 were 70,649 people with an average of 543 people per day, 33,064 people recovered with an average recovery of 254 people/day, and 3,395 people died with an average of 26 people per day. The maximum value analysis is done through the equation using the trend data. Regression results are used to determine the optimum treatment value, which gives the most significant impact in terms of response. The assumption used is a quadratic regression. The patient's relationship to the confirmed case formed a quadratic curve. The resulting model is:

$$Confirmed\ Cases = 110.608 + 1.214 * recovered + 4.747 * recovered^2 \qquad (3)$$

The optimum value was obtained from the first derivative equation (1) because, in the quadratic curve, the highest value or the lowest value (peak value of the curve) is obtained when dY/dX = 0, then:

$$Confirmed\ Cases\quad 110,608 + 1,214 * recovered + 4,747 * recovered^2$$

$$\frac{dY}{dX} = \frac{b^2 - 4ac}{4a}$$

$$Optimum = \frac{1.214^2 - 4(4.747 \times 110.608)}{4(4.747)}$$

$$Optimum = \frac{1.473.796 - 2.100.224.704}{18.988}$$

$$Optimum = 1.363.188$$

$$Re\cov ery_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{4a}$$

$$Re\cov ery_{1,2} = \frac{-1.214 \pm \sqrt{1.214^2 - 4(4.747 \times 110.608)}}{4(4.747)}$$

$$Re\cov ery_{1,2} = \frac{-1.214 \pm \sqrt{1.473.796 - 2.100.224.704}}{18.988}$$

$$Re\cov ery_{1,2} = \frac{-1.214 \pm 45.844,2854}{18.988}$$

$$Re\cov ery_{negative} = -2,48$$
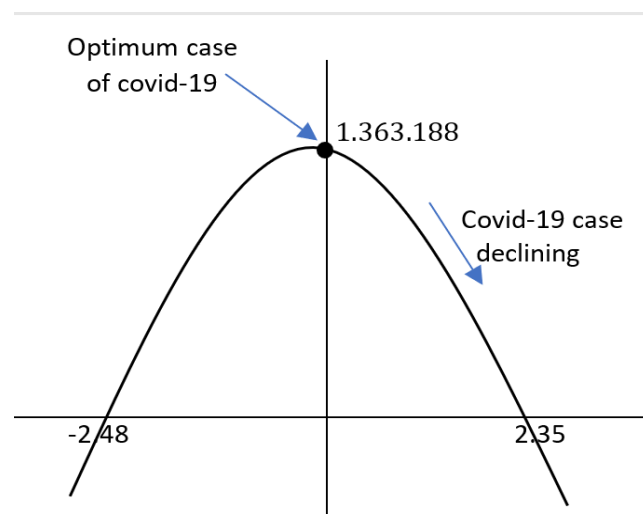
$$Re\cov ery_{positive} = 2,35$$

Figure 15: Peek Point Prediction Confirmed Case

From equation 2, it can be estimated that the peak point of the pandemic is 1,363,188 people, and it is also found that recovery is negative (R = -2.48), which means confirmed cases will increase and if the recovery value is positive (R = 2.35) then confirmed cases will decrease after reaching optimal point.

Conclusion

Decision-making is an optimal strategy that depends on risk preferences and unknown scenarios. Expectations depend on intertemporal extrapolation and information (bias or un-biased information), which is collected data from past periods and information about the current situation. In crisis and uncertainty conditions, without clear information and low levels of public confidence in the government in handling crises, causing people become panic and tend to use emotions rather than logic in making decisions, thus resulting in irrational decisions. The government is also facing a trade-off condition, maintaining the pace of economic growth or focusing more on health/social safety, but those decisions must be taken quickly even if the decision gives a severe blow to the economy and society. The future is uncertain, but using valid information held by the government can make assumptions and post-crisis planning in the form of a new-normal order. The government applies for the new-normal order assuming the region's readiness to control the Coronavirus spreading. In the new-normal era, post-cri-sis perspectives change over time; people will be dealing with improving living standards by changing their lifestyle habits, work, school and worship, and other social activities.

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